

**United States of America****PROPOSALS FOR THE WORK OF THE CONFERENCE****PROTECTION OF THE FIXED SERVICE FROM GSO FSS OPERATIONS
IN THE 11.7 TO 12.2 GHz BAND (REGION 2)****Background information**

The 11.7-12.2 GHz band is allocated to the fixed-satellite service (FSS) on a primary basis in Region 2, and the 11.7-12.1 GHz band is allocated to the fixed service (FS) on a primary basis in certain countries within Region 2 (See No. S5.486). The use of the 11.7-12.2 GHz band by FSS in Region 2 is subject to No. S5.488.

Recent modifications to No. S5.488 (previously RR No. 839) removed the explicit reference to No. S9.21 (previously Article 14). Consequently, at its 13th meeting in July 1998, the ITU Radio Regulations Board revised its Rule of Procedure for No. S5.488, stating that there is “no longer a need for the specific procedures of No. S9.21, in addition to the normally applicable coordination/agreement procedures of Article S9”. The Board and certain administrations expressed the view that the omission of specific reference to No. S9.21 in No. S5.488 removed the regulatory mechanism available for protection of terrestrial services from GSO FSS downlinks. Notwithstanding, the requirement that FSS systems in the 11.7-12.2 GHz band (Region 2) obtain prior agreement with those “administrations concerned and those having services, operating or planned to operate in accordance with the Table, which may be affected” remains.

Section 7.6.3 of the CPM Report identifies three possible approaches for protection of terrestrial services from GSO FSS operations in the 11.7-12.2 GHz band (Region 2): 1) hard power flux-density (pfd) limits for GSO FSS networks in Region 2; 2) use of power flux-density levels as threshold values which, if exceeded, would require the agreement of affected administrations; 3) explicit reference to No. S9.21 in No. S5.488 consistent with the regulatory regime that was applied to the 11.7-12.2 GHz band in Region 2 for many years.

Although GSO FSS and fixed-service systems have successfully co-existed in the 11.7-12.2 GHz band (Region 2) for many years under Article 14/S9.21 consistent with approach 3), concerns have been expressed that application of the former S9.21 approach implements only a limited time period for comments in the regulatory process. This proposal is responsive to these concerns.

In support of approach 2) above, pfd thresholds are proposed because they provide the required flexibility for administrations implementing GSO FSS systems, while still affording protection to fixed service systems. Under certain circumstances it is necessary for GSO FSS operators to operate at an increased satellite downlink power in order to serve a particular geographic

location (e.g. extreme latitudes served at lower elevation angles) or to provide certain types of carriers (e.g. analogue television, 16-QAM). Such power increases, however, will be minimized because satellite operators have a financial incentive to use only the minimum power required to close a link. Pfd thresholds allow for these types of GSO FSS operations, as necessary, provided that agreement is reached with any affected terrestrial administration. Pfd thresholds also allow for the advancement of satellite technology including the use of smaller antennas and higher/more efficient modulation schemes, particularly into under-served areas.

This document proposes to include in Appendix S5 of the Radio Regulations pfd levels to be used as thresholds for coordination of GSO FSS systems with fixed-service systems. These coordination thresholds would be applicable to GSO FSS systems in the 11.7-12.2 GHz band in Region 2. Under this approach, the requirement for coordination of GSO FSS networks operating in the 11.7-12.2 GHz band (Region 2) with terrestrial systems would be contained in a new provision of Article S9, ADD S9.20. An administration would send its coordination request to the ITU Radiocommunication Bureau (BR) pursuant to MOD S9.30. Upon receipt of the information, BR would identify those administrations with which coordination may need to be effected, based on exceedance of the pfd threshold levels contained in Appendix S5, and publish the names of the administrations in its Weekly Circular.

Because fixed-service systems in this band generally employ digital technologies, it is proposed to specify the pfd in a 1 MHz rather than a 4 kHz reference bandwidth. A 1 MHz reference bandwidth was also found appropriate for pfd limits applicable to non-GSO FSS systems in this frequency band. Therefore, the proposed level of protection to the fixed service from GSO FSS (space-to-Earth, Region 2) is as follows:

-124	dB(W/m ²) in 1 MHz	$\theta \leq 5^\circ$
$-124 + 0.5 (\theta - 5)$	dB(W/m ²) in 1 MHz	$5^\circ \leq \theta \leq 25^\circ$
-114	dB(W/m ²) in 1 MHz	$25^\circ \leq \theta \leq 90^\circ$

The above protection levels are equivalent to the following levels in a 4 kHz reference bandwidth:

-148	dB(W/m ²) in 4 kHz	$\theta \leq 5^\circ$
$-148 + 0.5 (\theta - 5)$	dB(W/m ²) in 4 kHz	$5^\circ \leq \theta \leq 25^\circ$
-138	dB(W/m ²) in 4 kHz	$25^\circ \leq \theta \leq 90^\circ$

The proposed coordination threshold pfd levels are 2 dB more relaxed (i.e. higher) than the values contained in ITU-R Recommendation SF.674-1, *Power Flux-Density Values to Facilitate the Application of Article 14 of the Radio Regulations for FSS in Relation to the Fixed-Satellite Service in the 11.7-12.2 GHz Band in Region 2*. This 2 dB relaxation is proposed in order for the Radio Regulations to be more representative of the actual operating conditions in this frequency band.

If hard limits as opposed to coordination thresholds were to be included in Article S21 of the Radio Regulations, the limits would need to be considerably more relaxed (i.e. higher) than the levels above in order to accurately reflect the existing and planned use of the band. It should be noted that ITU-R has not studied the pfd levels that would be appropriate as hard limits in the 11.7-12.2 GHz band segment. Because of the varying satellite and terrestrial system characteristics throughout the 10.7-12.75 GHz band segments, it is not appropriate to extrapolate pfd limits to other frequency band segments.

ARTICLE S5

Frequency allocations**MOD** USA/12/303

S5.488 The use of the bands 11.7-12.2 GHz by the fixed-satellite service in Region 2 and 12.2-12.7 GHz by the broadcasting-satellite service in Region 2 is limited to national and subregional systems. The use of the band 11.7-12.2 GHz by geostationary satellite networks in the fixed-satellite service in Region 2 is subject to previous agreement between the administrations concerned and those having services, operating or planned to operate in accordance with the Table, which may be affected (see Articles ~~S9~~ and ~~S11~~)coordination under No. **S9.20**. For the use of the band 12.2-12.7 GHz by the broadcasting-satellite service in Region 2, see Appendix **S30**.

ARTICLE S9

Section II – Procedure for effecting coordination^{8, 9}**Sub-Section IIA – Requirement and request for coordination****ADD** USA/12/304

S9.20 *ibis*) for a transmitting space station of the fixed-satellite service using the geostationary-satellite orbit in respect of stations of terrestrial services where the threshold value is exceeded on the territory of another administration;

MOD USA/12/305

S9.30 Requests for coordination made under Nos. **S9.7** to **S9.14**, **S9.20** and **S9.21** shall be sent by the requesting administration to the Bureau, together with the appropriate information listed in Appendix **S4** to these Regulations.

MOD USA/12/306

S9.51 Following its action under No. **S9.50**, the administration with which coordination was sought under Nos. **S9.7** to **S9.9** and **S9.20** shall, within four months of the date of publication of the Weekly Circular under No. **S9.38**, either inform the requesting administration and the Bureau of its agreement or act under No. **S9.52**.

MOD USA/12/307

S9.60 If, within the same four-month period specified in Nos. **S9.51** or **S9.51A**, an administration with which coordination is sought under Nos. **S9.7** to **S9.9** and **S9.15** to ~~**S9.19**~~**S9.20** fails to reply or to give a decision under Nos. **S9.51** or **S9.51A** or, following its disagreement under No. **S9.52**, fails to provide information concerning its own assignments on which its disagreement is based, the requesting administration may seek the assistance of the Bureau.

APPENDIX S5

TABLE S5-1 (continued)

MOD USA/12/308

Reference of Article S9	Case	Frequency bands (and Region) of the service for which coordination is sought	Threshold/condition	Calculation method	Remarks
No. ADD S9.20 <u>GSO/terrestrial</u>	For a transmitting space station of the fixed-satellite service using the geostationary-satellite orbit in respect of stations of terrestrial services where the threshold value is exceeded	11.7-12.2 GHz (Region 2)	<p>The power flux-density at the surface of the Earth, for angles or arrival (θ) above the horizontal plane, produced by emissions from a space station, including emissions from a reflecting satellite, exceed limits as follows:</p> <p><u>$-124 \text{ dB(W/m}^2\text{)}$ in 1 MHz for $\theta \leq 5^\circ$</u></p> <p><u>$-124 + 0.5 (\theta - 5) \text{ dB (W/m}^2\text{)}$ in 1 MHz for $5^\circ \leq \theta \leq 25^\circ$</u></p> <p><u>$-114 \text{ dB(W/m}^2\text{)}$ in 1 MHz for $25^\circ \leq \theta \leq 90^\circ$</u></p>	Check for exceedance of the threshold/condition	The limits relate to the power flux-density which would be obtained under assumed free-space propagation conditions

Reasons: Specific modifications to Articles S5, S9 and Appendix S5 of the Radio Regulations are proposed to include pfd coordination thresholds in the Radio Regulations, as identified in section 7.6.3 of the CPM Report, Approach 2. Pfd thresholds are proposed because they provide the flexibility required for GSO FSS systems to provide analogue TV and higher/more efficient modulation schemes, while still affording protection to fixed-service systems. In response to concerns expressed by terrestrial administrations, the proposed regulatory regime requires administrations to send its coordination requests to the ITU BR. Upon receipt of the information, the BR would identify those administrations with which coordination may need to be effected, based on an exceedance of the pfd threshold levels contained in Appendix S5, and publish the names of the administrations in its Weekly Circular.